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Gas Versus Fuel Oil.

[Prepared for the JOURNAL, by MR. HAROLD L. ALT.]

There comes a time when one should stop to consider what he is doing. In other words, what is he accomplishing towards conserving his resources? And, in our present day of keen competition, this not only holds true with man but with companies and corporations in which he may be concerned. And nowhere else does this fact apply more forcibly than to the concerns using fuel oil for power and metallurgical purposes. Gasoline at 26 cents a gallon, with prospects of its further increase, and with fuel oil containing a certain per cent. of gasoline selling at 4 to 5 cents a gallon, it will certainly pay the oil companies to remove that percentage of gasoline from fuel oil, leaving the latter less satisfactory for fuel. Accordingly the question, "What are we to use in place of fuel oil?" is a live one; and the answer is "Gas."

Of the three principal natural fuels, coal is in greatest variety and most common. Oil, it is true, has the greatest energy, but gas is the most convenient.

Extended experience with natural gas for power and metallurgical purposes has largely stimulated the production and use of artificial gas made from either coal or oil. Greater familiarity has led to the better appreciation of the advantages of gaseous fuel, and a much extended field of usefulness. The increasing cost and varying quality of liquid fuels, and failure of the natural gas supply have emphasized the value of the gas producer for converting solid into gaseous fuels. True, such conversion involves a loss of a part of the energy in the coal, and it is mainly because the gas can be utilized more efficiently that the duty obtained from it is greater than that given by the direct burning of the coal. Any process which claims to deliver in the gas an amount of energy greater, or even equal, to that in the original fuel is a delusion, the product of ignorance or of fraudulent intent.

The cheapest artificial fuel gas per unit of heat is common producer gas, or "air gas," as it might be termed, since the oxygen for burning the carbon to carbon monoxide is derived mainly from air. The associated atmospheric nitrogen dilutes the carbon monoxide, making air gas the weakest of all useful gases; that is, the lowest in combustible, both in weight and by volume. Next in the order of heat energy comes water gas, which you know is made by an intermittent process, first using an air blast to bring the fuel to incandescence, then shutting off the air and forcing steam through the fire. During the "blow" a lean producer gas is made which may sometimes be utilized, and the true water gas is made in the second period, or "run," the steam being decomposed by the C so that its H is freed and its O united with the C to form CO. The "air gas" and "water gas" may be kept separate or be mixed after generation.

The ideal reactions for the process are: During air blow, producing about

106,800 B.T.U., $2C + O_2 = 2CO$, where lean producer gas is desired also.
or
175,800 B.T.U. $C + O_2 = CO_2$, where water gas only is sought.

During steam blow, absorbing about

$$51{,}200 \text{ B.T.U.}, \quad C + H_2O = \underbrace{CO + H_2}_{\text{Water Gas.}}$$

The water gas thus made would, therefore, consist of equal volumes of carbon monoxide and hydrogen, or 50 per cent. CO and 50 per cent. H, having 344.7 B.T.U. per cubic foot. The energy required in the production of 1,000 cubic feet of water gas of the above composition is indicated as follows:

	Pounds.
500 cubic feet of H weigh	2.795
500 cubic feet of CO weigh	39.035
Total weight of 1,000 cubic feet	41.830

As carbon monoxide is composed of 12 parts carbon to 16 of oxygen, the weight of carbon in 39.03 pounds of the gas is 16.73 pounds, and of oxygen 22.30 pounds. When this oxygen is derived from water (steam) it liberates, as above, 2.795 pounds of hydrogen. The heat developed and absorbed in these reactions (disregarding the energy required to raise the coal from the temperature of the atmosphere to, say, 1,800°) is as follows:

	Heat Units.
2.795 pounds H absorb in dissociation from water 2,795 × 62,000	= 173,290
16.73 pounds C burned to CO develope 16.73 × 4,400	= 73,612
Excess of heat-absorption over heat-development	= 99,678

The next questions to be asked are these:

(a.) "How shall the gas be obtained; shall it be bought at a price of 80 cents to $1 for 1,000 cubic feet?"

(b.) "If not; for how much can gas be made, and what investment will be needed?"

(c.) "Is the operation reliable, and can gas always be counted on?"

(d.) "How much is saved per day over fuel oil?"

All of these will be answered from results of personal investigation

of gas plants in operation, without, of course, mentioning the location or make of gas producers.

Take question (a): How shall the gas be obtained. Shall it be bought at 80 cents to $1 per 1,000 cubic feet?

No, indeed; and this is where some gas companies seem to stand in their own light. I know an instance where a company having some 15 or 20 furnaces is trying local gas in one of them, and everything is satisfactory, save the bill at 90 cents per 1,000. What is the result? No more furnaces will be changed to gas; it is too expensive: So the answer to this question is to buy a gas producer and holder and make your own gas.

Gaseous from Solid Fuel.—Conversion into gas is the primary requisite for the utilization of other forms of fuel. Whether the gases of this conversion are combustible or not depends upon the nature of the fuel and the method of gasification. The combustible elements of all ordinary fuels are, chiefly, carbon (C) and hydrogen (H) in great variety of chemical combination and physical characteristics. In all cases, however, the products of their complete combustion contain only carbonic acid (CO_2) and water (H_2O), with the nitrogen (N), and probably some oxygen (O) of the air supply. With incomplete combustion they will contain in addition varying amounts of the gaseous combustibles, carbon monoxide (CO) hydrocarbons (Cx Hy), hydrogen, with possible tar and smoke as products of distillation, all having a heat value.

In ordinary grate or "direct firing" the object is to effect complete combustion in proximity to the fuel bed. Within the same chamber the fuel elements are vaporized, distilled, gasified and completely burned. The first two processes absorb heat, and there are advantages in separating them from the point where combustion of the gases occurs and where high temperatures are developed by the heat evolved.

The gas producer or generator accomplishes this. In it vaporization, distillation and gasification result in a combustible gas, which, led away to a separate combustion chamber, is there burned under conditions favoring a fuller realization of the fuel value and the attainment of temperatures otherwise impossible. As already stated, the use of the gas producer does not result in a greater amount of heat than does direct firing. Even in heating operations with close connection of producer to the furnace, and consequent utilization of the sensible heat of the gas, there is a loss of energy; but it should not exceed 15 to 20 per cent. of the calorific value of the fuel.

Notwithstanding this loss, experience has demonstrated that in the majority of cases a producer accomplishes the same result with less fuel, and has made possible metallurgical operations which were impracticable with direct firing.

Reasons Why Gas Firing Excels Direct.—These are numerous, and their thorough appreciation is dependent upon a clear conception of the principles of combustion. In part they are:

First.—More complete combustion is secured.

Second.—Higher temperatures of combustion are possible.

Third.—There is less loss of heat through the waste products of combustion.

Fourth.—Greater efficiency in transfer of heat.

Fifth.—Heat may be recovered from hot waste gases and returned to the combustion chamber in preheated air.

Sixth.—Gas and air supplies (therefore combustion) are in easy and complete control.

Seventh.—Avoids loss through grates and transport of coal; concentrates and minimizes labor in handling coal and ash; eliminates deleterious effect of ash or extraneous matter on the substances subjected to heat, and the irregularities of charging in direct firing.

These advantages are largely mutually dependent and rest upon the same cause. The theoretical amount of air necessary for combustion is largely exceeded in practice, and direct firing requires at least double this theoretical quantity, often much more, to even approach complete combustion. This defect is most marked with soft coals, for as combustion progresses the bed becomes more compact, and as the time for a new charge approaches is less permeable. Obviously, with a given draught, the amount of air penetrating decreases with an increased depth and compactness of the fuel. A fresh charge of coal requires a greater amount of air to consume its volatile matters, and needs it at a time when its passage is most retarded and combustion further impaired by the reduction of temperature accompanying volatilization. Therefore, with this irregular air requirement, the grates must be arranged to admit an excess of air at all times lest larger loss ensue from escape of unburnt gases.

In gas firing, the air supply may closely approximate that theoretically necessary and is always under control. Hence, combustion is more complete, because the small excess of air reduces the volume of the products of combustion. The heat evolved is concentrated in a smaller volume, raising the temperature of combustion, which in turn facilitates union of the oxygen with the constituents of the gas. Moreover, less air means lower dilution of the gaseous mixture by inert nitrogen and vapors which retard combustion, while the possible intimate mixture of gas and air promotes their contact and combination. The burnt gases, being of higher temperature, transfer heat more readily, and, because of reduced quantity, carry less to the chimney; but on their way they may be intercepted and compelled to impart a large measure of their heat to the air going to the combustion chamber, an expedient which experience has shown of small value in direct firing. By such recuperation and return of heat to the system we have an additional saving in fuel equivalent to the heat so returned, with the attendant advantage of still further promoting combustion, increase of temperatures and reduction of loss in waste gases.

The kind of gas producer required is a question which must be determined by individual requirements, and hardly two requirements exist the same for any two different cases. If it is a matter of heat values and temperatures demanded for certain work, then it is a problem of securing fuel, and the kind of fuel and its price vary with every plant.

What Constitutes a Good Gas Producer.—It is sometimes said that anything in the form of a closed box with a grate under it is good enough for a gas producer, and, in fact, several types of such gas producers have come into use owing to a desire to obtain everything of the cheapest possible construction, the sole idea apparently being to make something to sell, regardless of the essential conditions for producing good gas continuously, with minimum labor and no waste of fuel. The best conditions are briefly as follows:

1. The incandescent bed of fuel must be carried on a bed of ashes several feet thick, in order that the fuel shall gradually burn out and cool before being discharged. If the incandescent fuel is carried down close to the grate, it is impossible to prevent its passing through the grate in considerable quantities as coke, and that which is fully burned out passes away hot instead of cool and moist.

2. It is necessary to carry the blast conduit up through this bed of ashes, to near the point where the fuel is incandescent, thus avoiding the necessity of blasting through the ashes. By this means the depth of ashes on the grate can be made as great as desired; but that is not the case in producers, with the blast applied underneath the grates; they, of necessity, have to carry a shallow bed of ashes with consequent loss of fuel.

3. The ash zone of the producer should have ample facility for barring and breaking up clinker, and be cool enough for the operator to work conveniently. The enclosed dry bottom or combination type, with observation doors at the ash bed, has the advantage of exposing it to view when desired, and the operator may see what he is doing, which cannot be done in the plain water seal. In many such producers the ashes have to be forced through the grates by long bars from above, which involves the hardest and most trying labor, and necessitates the carrying of a comparatively shallow bed of fuel, otherwise the men cannot force their bars through it from above. This shallow fuel bed, with concomitant excessive poking, results in a poor gas, high in carbonic acid; for one of the essential conditions in making carbonic oxide and for decomposing the steam is a deep bed of incandescent fuel. Work with the bar from above should be merely to distribute the fuel properly over the surface after it has been dropped from the hopper, and not to poke holes through the fire. The ashes should be removable from an easily accessible space below, not through bar grates or similar contrivance.

4. It is necessary that the support upon which the contents of the producer are carried should be level. Any form of sloping grate, no matter how arranged, will give an uneven thickness of fire bed, the blast having freer access through the fire at some points than at others, and there will always be a shallow place through which coke can find its way without being consumed. Any form of ordinary bar grate is undesirable, in that it necessitates the passage of ashes through it. A sloping grate is particularly objectionable, for there is usually no access to the place where clinkers are formed, or, if such access is provided, it opens right into the gas producing zone, which involved either shutting off the producer entirely, checking the blast, or the possibility of suffocating the attendant by escaping gas.

Physical Properties, at 32° and 14.7 Pounds.

	Name of Substance.	Symbol.	Relative Weights.		Specific Gravity.		Weight of 1 Cu. Ft. in Lbs.	Vol. in Cu. Ft. per Lb.	Specific Heat.	
			Atomic.	Molecular	H = 1.	Air = 1.			Per Lb.	Per Cu. Ft.
Combustible.	Carbon	C	12	....	...	....	.....	....	....	...
	Carbon monoxide	CO	..	28	14	0.967	.07806	12.80	0.248	.0193
	Ethylene	C_2H_4	..	28	14	0.967	.07809	12.80	0.404	.0289
	Hydrogen	H	1	(H_2)	1	0.0692	.00559	178.88	3.409	.0194
	Methane	CH_4	..	16	8	0.553	.04464	22.40	0.593	.0264
	Sulphureted hydrogen	H_2S	..	34	17	1.177	.0950	10.52	0.245	....
Incombustible.	Air dry	A Mixture	..	..	144	1.000	.08072	12.38	0.237	.0191
	Carbon dioxide	CO_2	..	44	22	1.519	.12261	8.16	0.217	.0265
	Nitrogen	N	14	(N_2) 28	14	0.971	.07837	12.75	0.244	.0192
	Oxygen	O	16	(O_2) 32	16	1.105	.08924	11.20	0.217	.0194
	Gaseous steam	H_2O	..	18	9	0.623	.0502	19.90	0.480	.0173

Composition of Industrial Gases.

Kind.	CO_2.	O.	Illuminants or C_2H_4.	CO.	CH_4.	H.	N.	B. T. U. per Cu. Ft.
Natural gas	0.29	0.30	0.15	0.60	93.57	1.40	2.80	989
" "	0.60	0.80	6.00	0.60	67.00	22.00	3.00	892
Oil gas	0.90	....	17.40	....	58.30	24.30	...	967
" "	....	0.50	16.50	....	48.00	32.00	3.00	846
Illuminating	0.60	0.10	3.80	7.50	39.50	46.00	2.50	650
Coke oven gas	2.00	....	2.00	6.00	35.00	53.00	2.00	620
Water gas — Carbureted	1.50	0.50	18.50	19.00	25.00	40.00	4.00	575
Water gas — "Blue" or uncarbureted	4.25	....	. ..	35.93	1.05	49.50	8.75	295
Producer Gas.								
Anthracite—fuel	3.9	....	....	27.3	1.00	12.30	55.50	147
" —power	6.2	....	....	26.0	1.30	14.40	52.10	153
" "	12.1	0.2	....	18.3	1.00	20.50	47.90	144
" —suction	5.6	0.6	....	24.4	1.00	18.00	50.40	157
" "	6.1	0.7	....	20.2	1.20	15.60	56.20	136
Bituminous—fuel	5.7	0.4	0.6	22.0	2.60	10.50	58.20	150
" —power	7.9	....	....	23.4	2.10	17.10	49.10	162
" "	10.8	....	0.5	16.6	2.40	14.90	54.80	144
" —Mond gas	13.9	....	. ..	13.8	2.00	24.30	46.00	153
Lignite—fuel	6.4	0.8	0.7	22.0	1.60	9.60	58.90	138
" —power	9.6	0.2	....	18.22	4.81	9.63	57.53	148
Coke—power	4.8	....	....	27.60	2.00	7.00	58.60	140
" —suction	5.4	0.6	....	25.30	0.35	13.20	55.15	136
Charcoal—fuel	0.8	....	....	34.10	....	0.20	64.90	119
Wood fuel gas	11.5	....	0.6	28.40	2.90	0.50	56.10	145
" "	6.9	....	....	28.60	2.20	8.50	53.80	131
Peat—power	12.4	....	0.4	21.00	2.20	18.50	45.50	175
Siemen's	4.2	....	....	24.20	2.20	8.20	61.20	135
Blast furnace	9.37	....	....	25.84	0.54	2.96	56.00	105

5. Where the kind of fuel permits, a continuous, automatic feed is a satisfactory feature, the object of which is to spread the fuel uniformly and continuously over the entire surface of the fuel bed. It should thus contribute to evenness in quality and regularity of flow of gas, some reduction in labor and to the cleanliness and order of the plant.

For a successful gas producer the conditions are summarized as follows:

1. A deep fuel bed, carried on a deep bed of ashes; the first to make good gas, the second to prevent waste of fuel.

2. Blast carried by conduit through the ashes to the incandescent fuel.

3. Accessibility of the ash bed and proper facility for the removal of the ashes.

4. Level, grateless support for the burden, insuring uniform depth of fuel at all points, with consequent uniformity in the production of gas.

(b.) "If not, for how much can the gas be made and what investment will be needed?"

To answer this question let us take an imaginary plant, say a tool shop having 20 furnaces, burning on an average 200 gallons of fuel oil per hour, with a 10-hour day, and an average of 300 working days per year. Assuming a price of 5 cents per gallon for fuel oil, delivered at the plant, there is an expense of 200 gallons by 5 cents, or $10 per hour, or $100 per day for the oil fuel. If each gallon of fuel oil develops 140,000 B.T.U., the 200 gallons furnish 28,000,000 B.T.U. per hour.

A pound of coal will furnish on average 51 cubic feet of hot air gas, with a value of 100 B.T.U. per cubic foot, and 19 cubic feet of water gas, of 300 B.T.U. per cubic foot; a total of about 70 cubic feet of gas per pound of coal burned.

For furnaces it is best to use water gas at 300 B.T.U., as forge heats can be more quickly gotten up than with a gas of lower value, although hot gas with fewer B.T.U. is entirely practical for use in large furnaces. Then 300 B.T.U. by 19 cubic feet equals 5,700 B.T.U. 28,000,000 B.T.U., divided by 5,700 B.T.U., equals 4,912 lbs. of coal, or approximately 5,000 lbs., or 2½ tons. If good bituminous coal can be obtained at $3 a ton, the cost of coal per hour is $7.50.

In addition to this water gas is generated hot air gas, in quantity sufficient to supply fuel to all the furnaces now using oil. So there are 5,000 by 51 cubic feet, equals 255,000 cubic feet of hot air gas, with a heat value of 100 B.T.U. besides.

Allowing 10,000 B.T.U. equals one effective horse power of hot air gas:

255,000 cubic feet by 100 B.T.U. equals 25,500,000 B.T.U.
25,500,000 B.T.U. divided by 10,000 equals 2,550-horse power.

This results in the furnaces getting 19 cubic feet by 5,000 pounds of coal, or 95,000 cubic feet of water gas, and 2,550 electrical horse power, all for a cost of $7.50 for coal per hour, against the cost of $10 per hour for fuel oil.

This 2,550 electrical horse power it is possible to turn into electrical

energy for industrial use—for instance, individual power drive for other machines. In other words, using this producer or hot air gas (which would otherwise waste into atmosphere) by storing it in a holder and supplying from the holder to producer gas engines direct-connected to electric generators, it is possible to develop about 2,000 kilowatts of electricity, with a saving on the power bill at least .01 per kilowatt hour, or $20 per hour.

Summarizing these figures it is seen that: First, the cost of fuel oil is about $10 per hour, and that, at a cost of $7.50 per hour for coal, it is possible to develop the necessary B.T.U. to replace the fuel oil, and in addition save $20 per hour for electrical power. Suppose the difference between $7.50 and $10 per hour (or $25 per day) be allowed for upkeep and repairs to the electrical machinery, then, for the difference between the first cost of the gas producer and the present necessary fuel oil equipment, a certain amount of power is being produced at absolutely no cost.

(c.) "Is the operation reliable and can gas always be depended upon?" Yes! With a little intelligent care in operation, and keeping the generators clean, there is no need to have any shutdown from lack of gas; this is proved by plants that have been running for the past 10 years without a shutdown. Of course, like all other machinery, it is advisable to have an auxiliary unit for large operations.

(d.) "How much is saved per day over fuel oil?" This question has been answered in reply to question (b.), although it might be said that, with a plant requiring formerly 3,000 gallons of fuel oil per day, a gas producer plant, costing complete $50,000 and adding, say, 20 per cent. for repairs, interest charges, insurance, etc., could be installed and the first cost saved within 5 years by the difference in cost between your gas producer plant and fuel oil. The tables on page 355 will be of interest.

In closing it is desired to give credit to Messrs. R. D. Wood & Co. for some of the facts and figures used.

Closer Relationship between the Engineering and Commercial Departments.

[From a Paper prepared jointly by MESSRS. C. N. STANNARD and F. Q. CANNON, for American Gas Institute.]

The authors remarked it was not their intention to give only their own ideas in regard to the matter, nor only the methods adopted by the companies with which they are connected. The aim had been to make the paper a composite one, embracing the views and suggestions of people connected with the gas industry in its various branches. To this end they submitted various phases of the subject to prominent gas men in the United States, Canada, Mexico, Europe and the Orient, with the request for information and suggestions.

To say that these requests were generously complied with was putting it mildly, and the authors only regret that time and space were inadequate to present each in its entirety. In order that the scope of these suggestions might be known and credit given to those who offered assistance, the authors express thanks to the following:

Mr. Geo. Steinwedell, St. Paul, Minn., Gas Company.
Mr. W. K. Vanderpoel, Public Service Electric Company, Newark, N. J,
Mr. S. V. Walton, Pacific Gas and Electric Company, San Francisco.
Mr. R. C. Ware, Boston Consolidated Gas Company.
Mr. S. M. Kennedy, California Edison Company, Los Angeles.
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Mr. H. K. Dodson, Cons. Gas and Elec. Lt. & Power Co., Baltimore.
Mr. G. W. Faller, City Light and Water Company, Amarillo, Tex.
Mr. Wm. J. Clark, Westchester Lighting Co., Mt. Vernon, N. Y.
Mr. John C. D. Clark, Utah Gas and Coke Company, Salt Lake City.
Mr. Glenn R. Chamberlain, Grand Rapids (Mich.) Gas Light Company.
Miss E. M. Young, Yokohama, Japan.
Mr. J. W. Ison, Davis Gas Stove Company, Eccles, Lancashire, Eng.
Mr. N. D. McPhail, Mexico National Gas Company, Mexico City.

Each individual, department or company has conditions peculiar to itself and some of the suggestions herein made may not be effective with all companies, but the business, however, is, in the main, well standardized and methods which prove beneficial with one company may not well be overlooked by others. Genuine co operation is as essential to the success of one company as another, and, except for local conditions, the same vexatious problems confront all.

Much has been written of co-operation, the tendency being to drift into glowing generalities, yet co-operation is essential and is desired by all companies, so there was no need to say why this was so. Rather, they should endeavor to make use of practical ideas and plans. How to obtain the desired result, rather than its need, is the aim of this paper. The subject is divided into a number of subheads which would be taken in order, touching only the most vital points of each.

TOPIC I.—*How the Commercial Department, Co-Operating with the Engineering Department, can Reduce Installation Costs.*

One of the tasks of every business being to minimize costs of production, operation, etc., in the gas industry the necessity of keeping down installation costs was apparent. The actual installation work fell to the engineering department, but the securing and holding of business, which make such installation work possible, fell on the commercial department. The men in both departments should thus be conversant with the duties of the other. As one commercial manager said, "I do not hire any agents who are not practically or technically educated as engineers." Many companies have their engineer spend some time in the commercial department, and such interchanges of knowledge are helpful to both departments.

There are nearly as many ways in which the engineering department, by co-operating with the commercial, may reduce installation costs, as there are the other ways about; but it is hoped that cases are rare where, in order to get the prompt and careful attention to which the customer is entitled, orders must be turned over with "prayers and pleadings" of the commercial department to get the engineering department to give them proper attention. A little co-operation by the shop with the commercial department would give a prompt and satisfactory jub to the customer at a minimum cost to the company. A satisfied consumer may well be considered as a part of reduced installation costs.

It is imperative that orders originating in the commercial department shall give time and date when installation is to be made, as it is hardly to be expected that the shop foreman, when he receives an order to "run pipe," "fix leak" or "adjust burner," with no further information, can execute these as economically as if some definite information regarding the installation had accompanied the order. It is not always convenient for the customer to do without gas while the installation is being made, and a fitter and his helper may have to return at some other time, and part of a day's work is lost. If orders are vague, the shop foreman, before he sends to make the installation, must send a man to obtain the information which might have been furnished him with the order. Rough sketches are a great help, and any commercial man should be able to get ample information for ordinary installations.

TOPIC II.—*The Relation of Good Service by the Engineering Department to the Securing and Holding of Business.*

Volumes could be written on good service as applied to the gas industry, but suffice it to say that good service does for a gas company what courteous treatment and fair dealing do for a merchant. The customers come back. They tell their friends and neighbors of it, and these people in turn are boosters. The consumer's idea of good service is not always the company's idea, still the average user of gas is generally fair-minded, and some companies employ men to visit a consumer's premises to see that good service is maintained. This means it is essential that a gas range, just the same as a large industrial installation, should give satisfaction. Good service may well be counted as an advertising asset, and, if it be maintained, the question of cost is more easily dealt with.

TOPIC III.—*The Attitude of the Engineers as Representatives of the Company when Meeting the Public.*

Every employee should remember he is a representative of the company, and that his attitude toward the public will be construed as the company's attitude. The commercial man gets the business; the engineer is responsible for the service. Let the engineer convince the consumer that the company is as greatly interested in having his business a success as it is in getting its share of business from him. The representative is seeking and creating new business, and any en-

gineer who has the opportunity to do this class of work owes it to the company to do it. It is well to make a point of having the engineer meet prospective as well as actual consumers, to discuss with them matters of mutual interest.

TOPIC IV.—*The Tendency of the Commercial Men to Secure Business at an Excessive Cost from an Engineering Standpoint.*

It occasionally happens that over-energetic or negligent commercial men, in order to please a consumer or to obtain a flattering contract, will agree to do work which will be more expensive than necessary. Most companies avoid this by having charges and rates well defined. Service charges, pipe and fixture contracts, etc., are examples of this, and no commercial man need fail on so simple a proposition. On special work it should be borne in mind that the taking of an order for a piece of work is not all the story. It has its engineering side also. If the commercial man is not conversant with the engineering details of the job, let him get the opinion of the engineering department, before he quotes prices and asks for the consumer's signature to a lease or contract. We have in mind a case where considerable work could have been saved, if the engineering department had known that the commercial men were figuring on a second consumer whose service could be partially taken care of when supplying the first consumer. Many companies have a rule that a piece of business must show a revenue of a fixed percentage of the cost of installation. This serves as a guide to both the engineering and commercial departments. The tendency on the part of the commercial man to secure business at excessive costs can largely be overcome by establishing definite rates and charges by the company and by the practical co-operation of the two departments.

TOPIC V.—*The Absolute Dependence of the Commercial Department on the Engineering Department and Vice Versa.*

It is quite natural that a business organization should be likened to a delicate machine when the inter-dependence of any two departments is to be shown. One defective part in the machine will put it out of use or make it work faultily. Just so can one department of the company set the whole organization awry. Each department is dependent on the others.

As to the special dependence of the commercial department on the engineering department, let it be first stated that any selling organization depends for its existence on furnishing a product to sell. Its success depends on quality of that product. In the case of gas, its purity, uniformity of specific gravity, heat value, pressure, etc. The engineering department must be looked to for the supply and for the prompt correction of faulty service. The prompt execution of orders converts into facts the promises made by the commercial men, and this conversion is brought about by the engineering department. A knowledge of technical affairs can be most readily obtained from the engineering force, and, as the commercial man has daily need of such information, he may well look to the engineer for it.

Some features of the dependence of the engineering on the commercial department may be summed up as follows: No producing organization can exist unless its product is disposed of; and, naturally, a company wishes to increase its output from year-to-year. Some part of the product can be disposed of without any particular selling effort; but a healthy growth requires an aggressive selling propaganda. To quote one of our contributors, "We have evolved from the business of simply making and selling gas to a population which 'must come to the gas company,' to the newly realized idea of a public service corporation having an obligation to the community." An engineering department might exist without a commercial department, but it would either stand still or grow weaker if the development work of the commercial department were relaxed. The commercial department is brought into the field of competition to a far greater extent than is the engineering department of a non-competing company. The stimulation from an aggressive fighting department extends through the whole company organization, and tends to bring new ideas and new energies into all departments.

As the commercial department is dependent upon the engineering department for cautioning and advice, the engineering department may well look to the commercial department for suggestions regarding its policy and practice toward the public. Not infrequently that which seems reasonable and conservative to the engineer is against the best interests of the company, on account of delaying prompt service or creating a feeling of suspicion or dissatisfaction on the part of the customer. In summing up this topic, the most important point to be borne in mind is that criticisms and suggestions from one department to the other should be earnestly desired, frankly given and thankfully received. Remember, if the commercial department is not active there will be only a slightly increased demand for the product, and operating costs will not be decreased. If the engineering department is not alert the new business will not be taken care of promptly and satisfactorily, which means a disappointment to consumers and a consequent loss of revenue to the company.

TOPIC VI.—*The Influence of Commercial Men upon the Continual Development of Engineering Activities.*

The manufacture and distribution of gas follow along well defined lines, but the uses to which gas may be put are still changing. Each new installation requires engineering skill and attention, and any new use to which gas is applied widens the engineers' field. The commercial man discovers new uses for the product, and it is for the engineer to design appliances and to do the technical work to insure efficient operation of the installation, and the public is more interested in the developments in the use of gas than is generally supposed. The commercial man stimulates this interest in his daily conversation with the result gas is a positive contender in any fuel or illuminating problems which the prospect may meet. In general, everyone should be more of a booster than is usually the case. The commercial man is generally not afraid to talk shop out of business hours, in a more or less conversational manner, that robs it of objectionable business flavor.

TOPIC VII.—*The Value of the Commercial Men Learning the Methods of the Engineering Department and Vice Versa.*

The old maxim, "A jack of all trades is master of none," may have been apropos when men were of choice or necessity forced to perform but one task, yet we have such startling examples, however, of men who achieved the greatest business successes through intimate knowledge of every phase of the business, that one need not have the slightest fear of the two departments interchanging ideas and knowledge of methods. Indeed, such an interchange tends to create an estimable and stimulative rivalry which would have good effect on the whole organization. The commercial man who gains a knowledge of engineering methods can save himself and the engineering department much effort and detail work, and save money to the company. The engineer, if conversant with commercial methods, can do much for the consumer while attending to his own work which might otherwise necessitate extra visits of the commercial men.

TOPIC VIII.—*Closer Association between the Two Departments.*

We doubt if there is anyone who does not believe that closer association in a business and a social way between employees of the two departments is desirable. There is no need to define the degree of friendship or intimacy to be reached in these social relations, but it should be strong enough to make it a pleasure for one to serve the other. The business relations are more easily defined, and honest business practice will keep these relations as they should be, and cordial relations between department chiefs will engender a spirit of good fellowship among employees.

It is to be expected when departments are very busy, or working in a state of high tension, that some surges will be started. Right here then we need some of the get-together spirit—one department should realize the stress under which the other department is working and due leniency should be shown. Closer association between departments will minimize those vexatious things that constantly crop up; each too small to cause much trouble, but which in their bulk call for prompt removal. One department may be daily doing little things which annoy or hamper other departments, but they are certainly not intentional, and the chief of the offending department would not knowingly permit the needless friction. A ready, investigative spirit should be maintained by each department, and criticisms or complaints should receive careful consideration. In such matters we must forsake old-time defensive attitudes, letting the co operative idea take their place. Make good use of criticism rather than resenting it, and this will help us do justice to more than those immediately around us.

TOPIC IX.—*More General Interchange of Ideas at Monthly or Quarterly Meetings.*

The frequent coming together of the men of the two departments has a twofold value, affording opportunity for discussion of questions pertaining to the company's business, and bettering the social relation between the employees. Just what nature such meetings should assume is a question each company must individually work out. A mixture of the social with business is employed by many,

while others segregate the two absolutely. If the employees are really interested in their work and anxious to advance, an occasional meeting will not be a wasted evening. If the interest is there, the meetings can be made a pleasure as well as a source of knowledge. Let the members of one department act the part of the consumer in a discussion with the other department, and many points daily met with and stumbled over will be made clear. Information thus obtained is not easily forgotten, for each man will realize that the eyes of the men with whom he is competing are upon him. In dealing with the consumer, a commercial man or an engineer often feels safe in making statements about which he is himself not sure, but in discussing such questions with his fellow employees he may realize he is dealing with men who perhaps know more of the subject than he does.

TOPIC X.—*Influence of the Engineering Department in Laying Out in Advance Extensions which are Later Followed Up by the Commercial Men in Securing Business on Said Extensions.*

People off or not on the gas lines are, as a general rule, interested in gas; it is the old story of wanting what they have not. Their friends and neighbors use gas and speak of it; naturally the former wish to be as up-to-date as others. Little information can be given such a prospect unless the engineering or commercial departments have visited the possible extension and made a report. If the residents on such an extension see the engineers of the gas company making measurements in the street their curiosity is aroused. The interest in gas is increased, and a word dropped by the men to the effect that "the gas company is trying to accommodate this section with gas" will prepare the commercial man's approach. If extensions are laid out in advance the representatives can have maps and figures showing each house, its distance from the main, etc., and there is no chance of making rash promises. This businesslike way of handling the subject will appeal to the prospective users, who will have added confidence in the company and its goods. People will be more willing to listen to the salesman's story if the work antecedent to his visit has been well done.

It might be well for locators, foremen and others in the engineering department, whose duties take them to extensions, to be furnished with prices on ranges, water heaters and other gas appliances. Prospects could thus know, while they were enthused over the idea of using gas, what the appliances would cost, and orders might be obtained in advance. A knowledge of just what appliances a certain extension will require would prove beneficial to the appliance department in the placing of orders.

TOPIC XI.—*The Feasibility of Combining the Two Departments.*

The age in which we live is the age of specialization. Cases of over-specialization prove there are ruts into which any of us may fall. We cited the example of the successful men conversant with all branches of their business, but we might add that these men are also specialists in each branch. Reducing the number of working parts is the mechanic's dream, because power losses can thus be minimized, as losses must likewise be minimized in the operation of a business organization; but whether a combination of the two departments would help the situation is a question. Two factors entering into the proposition are, cutting operating expense, and increasing the efficiency of the organization. If, when expense is cut, the standard of efficiency is lowered, nothing has been gained.

The remarkable growth of the gas industry has been due to a combination of engineering and commercial improvements, each being entitled to its share of credit. Every company has an engineering department, but not all have commercial branches, so a comparison of these two classes will, we believe, show that the commercial department has been a great asset to the companies that adopted it.

Some have tried to combine the two departments by having only trained technical men in the commercial section; but even then the two departments were maintained, and other companies had just as large a measure of success with commercial men having no special engineering training. The writers feel that a combination of the two departments would still leave the commercial and engineering fields to be taken care of and, unless a saving of money or an increase of efficiency could be effected, the consolidation would be useless. The individual capability of the head of each department, or the capacity of the head of the combined departments, might largely influence whether the two departments should be combined. As special cases require special treatment, it is difficult to cover in a general rule conditions found in some particular locality.

TOPIC XII.—*How Does Each Department Assist in Giving Good Service, which is the Primary Purpose of the Company?*

Good service is a most essential link in the gas company's operation. As a manufacturer must keep the standard of his goods high, if he wishes future orders, so must the service furnished by a gas company be of the highest order.

Any good service which may be attributed to the commercial department should start when our relations with the customer begin; i. e., when application for service is received. If the commercial man gives accurate and definite information at this time, the customer will not be disappointed by finding things different from what he expects. The commercial man, through frequent visits to the customer's premises, can ascertain just what results are expected from the contemplated installation, and this information will assist materially in the correct planning of installations.

Orders emanating from the commercial department must be executed as described on the order, and this is an additional reason why the commercial and engineering departments should be in perfect accord. Commercial men should at all times be advised regarding the ability of the engineering department to do work of any nature. The representative makes promises as to the time a job will be started and finished, and as to what the installation will do; but it remains for the engineer to carry out these promises. The consumer will not consider that he is receiving good service if the fitters go about their work in a different manner from that which the commercial man promised.

Perhaps the strongest point that can be made for the assistance which the commercial department may render is that, as a rule, commercial men are better acquainted with the consumer, his business and its relation to the gas business, his installation and his disposition. The strongest card the commercial man holds is his intimate personal acquaintance with the patrons of the company, which friendly relation permits him to visit the consumer's premises at all times.

If there is any defect apparent in the service being rendered the consumer, the commercial man can aid good service by remedying the defect himself or reporting it to the trouble department, and at the same time gain the further friendship of the consumer.

If we consider the revenue that might easily be lost, due to the fact that one small appliance or a burner on a gas range was not in condition to be used by the consumer, we see the necessity of careful watchfulness on the part of the commercial man. Some companies equip their commercial men with a kit of tools, enabling them to adjust mechanical defects while doing their commercial work, and added expense to the trouble department may thus be saved.

The engineering department may assist by so designing the installation that the possibility of interruption to service is reduced to a minimum. In most organizations the engineering department comes less often in contract with the customer than the commercial man, and its duty lies chiefly in planning to avoid trouble. Inasmuch as the trouble department is a part of the engineering branch, the rendering of good service may be accelerated if complaint orders are promptly executed. One gas company in mind tries to maintain a 5-minute schedule on complaint orders. That is, if a customer telephones the office complaining of a gas leak, poor pressure or other trouble, a man is supposed to reach the premises within 5 minutes. This high depree of promptness may be more than most of us can attain, but it shows the necessity of being alive to the needs of our consumers.

TOPIC XIII.—*Commercial Men to Spend Some Time in Practical Engineering Work and the Engineers to do the Same in the Commercial Department.*

Unless a commercial man has technical education, he must rely on practical experience and his individual effort and study for a knowledge of the engineering branch of the business; but so must the engineer, whose early training has been entirely technical, gain an idea of commercial methods through contact with them. It is an easier proposition, perhaps, to make a good commercial man of an engineer than it is to make an engineer of a commercial man. In one of the topics we noted that some companies, whose commercial men have had no particular technical training, fairly had achieved just as remarkable success as that insisted on their commercial men being graduates of technical schools. Most companies are so engrossed in making their business successful and profitable that they cannot afford time to examine how, when and where their men have gained a knowledge of the business. A company is most interested in whether

its men are better qualified to do the work essential in the running of a successful business, than any other men the company can obtain.

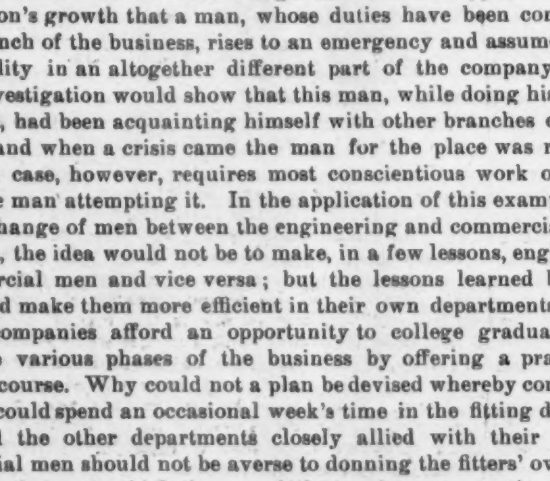
Taking for granted, then, that the more conversant a man is with the business of his company, the better qualified he is to give value received to the company, we feel that an interchange between the two departments is an advisable thing. It has often happened in an organization's growth that a man, whose duties have been confined to one branch of the business, rises to an emergency and assumes the responsibility in an altogether different part of the company's affairs. Investigation would show that this man, while doing his own work well, had been acquainting himself with other branches of the business, and when a crisis came the man for the place was ready. Any such case, however, requires most conscientious work on the part of the man attempting it. In the application of this example to the interchange of men between the engineering and commercial departments, the idea would not be to make, in a few lessons, engineers of commercial men and vice versa; but the lessons learned by the men would make them more efficient in their own departments.

Many companies afford an opportunity to college graduates to touch the various phases of the business by offering a practical students' course. Why could not a plan be devised whereby commercial men could spend an occasional week's time in the fitting department and the other departments closely allied with their work? Commercial men should not be averse to donning the fitters' overalls and doing the work which they are daily turning over to the engineering department. A plan could be formulated for engineering men to accompany commercial men in their daily work, thereby learning enough of commercial methods to understand the commercial department's point of view.

In conclusion, let us say that co-operation is essential, and that every man in a company must realize it and work for it. The company's officers cannot bring it about nor can the employees alone effect it. Personal feelings and department antagonisms, if there be any, must be forgotten, and a united effort be made by the commercial and engineering men.

A New Tar Extractor.

In a paper read by Mr. H. F. Smith, printed in the *Jour. Am. Soc. of Mech. Engineers*, the author notes that as the tar and other mechanical impurities in raw bituminous producer gas are in an extreme state of subdivision, and that as the number of particles present is so great and the quantity of gas handled is so large, the problem presents more than ordinary difficulties, and ordinary types of mechanical gas washers leave much to be desired. He then goes on to say: My object has accordingly been to produce equipment that will yield gas of a higher degree of cleanness than obtainable by ordinary methods. The apparatus in its present stage of development can be readily understood from the accompanying drawing.



The raw gas leaving the producer is first cooled until the tar vapors are condensed, and then by a rotary gas pump *B*, delivered under pressure into the main *C*, through the porous diaphragm *E*, and into the main *F*. *G*, is a separator in which the tar accumulates.

The structure of the diaphragm *E*, and the materials used have an important bearing on its operation. The former must be sufficiently porous to permit the gas and tar to pass freely, or it will be blocked with deposits from the gas. Several materials can be used for this, but spun glass seems best. The glass fibers are not altered by chemical action, and seem to possess the necessary physical properties. The spun glass in the form of glass wool (slag wool is not practicable for this purpose) is in the form of a diaphragm retained between two metal screens, the density of the diaphragm being regulated by the quantity of glass used and by the degree of compression between the screens. Ordinarily, the diaphragm is approximately ½-inch thick, its diameter determined by the quantity of gas to be passed. About 400 cubic feet per hour can be handled for each square inch of surface. No tar is retained in or on the diaphragm, the gas and tar passing through together, but an important change occurs in the physical state of the tar. On the inlet side of the diaphragm the tar is in the form of very minute particles, a tar fog. In passing through the diaphragm these particles coalesce and, on the diaphragm side, are of relatively large size, and drop out by gravity. They then collect in the drip *G*, and can be removed through a bottom connection.

It appears possible to secure almost any desired degree of cleanness by regulating the pressure maintained across the diaphragm. In ordinary operation a difference in pressure of from 2½ to 4 pounds will give a degree of gas cleanness ample for commercial requirements; 30 cubic feet of gas cleaned in this way can be passed through a white filter paper without producing any discoloration.

At low velocities the gas will pass the diaphragm without any apparent alteration, the effectiveness of cleaning being directly related to the velocity of flow. For example, the cleaning with a velocity of flow resulting from 5 pounds pressure is very much greater than from 1 pound differential, and when the pressure is a few ounces only, there is no perceptible change in the tar by passing through the diaphragm.

The tar separated by this process is practically water free, and can be used for any purpose to which coal tar is adaptable. One sample of tar showed a water content of less than 1 per cent., and the calorific value of the tar from Hocking coal is approximately 15,800 B.T.U. per pound, or about 140,000 per gallon.

For continuous operation the tar must be sufficiently fluid to pass the diaphragm without undue resistance, and it is necessary to keep the temperature of the gas at a point that will reduce the viscosity of the tar to a point as low as is consistent with complete condensation of the tar vapors. This apparatus would not be well suited for gas containing large quantities of lampblack or for gas from coals yielding very viscous tars, but for high volatile coals and for lignite, it has been found practical and effective. It is possible that further developments may extend its applicability to conditions which are not now considered practical.

Two theories have been advanced in explanation of this action. The first and most obvious is that the tar particles are precipitated by collision with the threads or filaments of the diaphragm. That this is not a complete explanation is indicated by the fact that the material of the diaphragm has a marked bearing on the effectiveness of the process, indicating some action other than simple mechanical collision. If the diaphragm is made of steel wool instead of glass wool the process does not operate with anything like effectiveness, although it would seem that the possibility for collision would be the same in both cases.

A phenomenon, first observed by me in 1902, gives weight to the theory that there is some action other than mechanical collision. If gas is passed through a small tube with perfectly smooth walls, no particular precipitation of tar occurs as long as the velocity of travel is slow. However, as the velocity increases to a point where there is considerable friction between the gas and the tube a heavy precipitation of tar shows on the surface. This leads to the conclusion that friction is in some way concerned, since the probability of mechanical collision is rather remote. Since friction between rapidly moving gases and enclosing tubes is known to produce electrical phenomena, it was assumed that this might possibly have some bearing on the action of this process, and an effort was made to work out a tar extractor along these lines. Accordingly an experimental apparatus was constructed with heavily charged electrodes to precipitate the tar particles and fair results were secured. A rate at which the tar particles could be moved through the gas by moderate potential gradients was very slow, and it was necessary to use exceedingly high potentials to secure effective results. On account of the difficulty of maintaining proper insulation under these potentials, and the danger of injury to an unskilled operator, this method was not considered

(*Continued on page* 362.)

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NEW YORK, MONDAY, DECEMBER 8, 1913.

[Special Editorial Correspondence.]

NINTH ANNUAL CONVENTION, NATIONAL COMMERCIAL GAS ASSOCIATION.

HOTEL WALTON, PHILADELPHIA, PA., Dec. 2, 1913.

Four-score, plus eleven, journeyed in the "New York Special" yesterday afternoon, and although a slight drizzle dampened the atmosphere, it in no wise rendered limp the enthusiasm with which the delegation was received by a "Committee of Escort" in the great depot at Broad and Market, etc.—and right here let me say, once for all, that the work done by the committees of entertainment (both regular and "sub.") could not have been excelled. Mr. Lewis Lillie captained the main committee (he was ably assisted by co-Captain J. B. Douglas', and the sub-Committee, in charge of the entertainment of the women visitors (Mrs. C. W. Wardell, Chairwoman), and when I say that the main committee comprised 50 members and that the sub numbered 40, a recounting thereof would be like reprinting the "Quaker City" social blue book. Their attentions were unremitting, their acts masterful but not boastful, their success unbounded, their reward a grateful appreciation of work well done.

An hour later, when the vanguards of the Commercial army were assembled in and about the Bellevue-Stratford headquarters, one might readily be forgiving for declaring that some social function of Nation-wide importance was on; and, to tell the truth, so it was. For in the gas men's assemblage could be readily identified the faces of many men who had made their mark in manner to attract the attention of all America. The bustle and animation of renewing old acquaintanceship, and the like activity in making new friends (both of which pleasures were very much in evidence), soon brought the time for responding to the call of "On to the exhibition," and "on" it was. And here let me register a mild line of criticism. This exhibition is really on such a large scale that the shelter in which it was placed is really not at all adequate for the purpose. And this is not said in any sense derogatory to Horticultural Hall as a show place; but the fact is that it was called upon to take care of more than its capacity could stand.

Here are housed 72 exhibitors, or 14 more in total than in the show at Atlanta last year, with the results that the exhibits are "more or less" displayed in or on every available spot on the ground and second floors. However, other than to say that the exhibition was an interesting one, and that its story will be properly told later on in the JOURNAL, let me pass to the rest. The lighting effects, as planned for the exterior and interiors, on streets and in meeting places, are surely magnificent examples of that which can be done by gas in the illumination field, whether in the building or afield. This splendid work, of course, will also be made more specific in later issues, so let me merely say here that the three Companies mainly concerned in the tasks—the Welsbach Lighting Company, the General Gas Light Company and Messrs. Bayley & Sons—very much more than made good in respect of the tasks allotted them.

At 10 this morning the convention was called to order in the Academy of Music, and the President (Mr. C. Willing Hare) had the satisfaction of handling the gavel for an audience (into the thousands) representative of the industry in really royal way. Hare is a pretty well-settled sort of a gentleman, who, while not being exactly of the order sedate, does not ruffle easily, but he would not have been "of the earth," did he not feel a trifle exalted when first viewing that maze of men, whose wish for the advancement of their common calling was strikingly exemplified in their attitudes of expectancy. The hum that followed the call having been silenced, the Association was welcomed in cordial manner by the Commissioner of Safety, Mr. Porter. The welcome having been gracefully and wittily responded to by Mr. E. N. Wrightington, the regular order was taken in hand. This included a mass of routine, prominent in which were many things that vitally concern the routine working of the Association. The announcement of the result of the balloting for and election of new members during the year was received with especial acclaim. The pressing routine business disposed, Vice-President C. M. Cohn (and the verdict was he is all-to-the-good) assumed the chair, while President Hare read the annual message. It was a comprehensive resumé naturally given over to a recital of the state of the industry from the commercial standpoint, and that it was satisfactory was well indicated by the cheering which followed its rendition. The election for officers was then taken up, with the following result:

President.—P. S. Young, Newark, N. J.
First Vice-President.—A. P. Ewing, Detroit, Mich.
Second Vice-President.—W. H. Pettes, Newark, N. J.
Third Vice-President.—J. C. Rushin, Atlanta, Ga.
Treasurer.—H. B. McLean, N. Y.
Secretary.—Louis Stotz, N. Y.
Directors (2 year term).—R. C. Ware, A. F. Stanniford, T. R. Elcock, A. L. Krippner and Clarence Roberts.

Minneapolis, Minn., was named as the next place for meeting. Next in order came a very important report from the committee to consider proposed affiliation with the Institute. It was presented by Mr. P. S. Young, and the question was gone into at great length, every possible phase being dispassionately dealt with. The crux of the findings was a recommendation not to affiliate, since each body could by separate organization the better promote the respective objects of the two bodies. The way in which the report was received surely proved that committee and rank and file were in accord with the findings; further, President Hare in his address foreshadowed what the findings were likely to be, and gave the separate plan his unqualified approval. The plan of procedure this year was the cutting out of set papers, the technical matter being confined to reports from committees specially delegated to consider subjects or topics named in advance. And the plan worked.

After luncheon the first subject considered was the report on "Relations with Customers," read by Chairman R. R. Young. In the brisk discussion that followed, a prominent speaker was Mr. Cohn (Baltimore) who, in quoting from personal experience, added much to the value of the set report. In fact, it was decided to name a committee charged with the preparation of a handbook in this respect, the complete story told by Mr. Cohn to be incorporated therewith. The next topic was connected with the "Gas Equipment of the Home," which was tellingly told by that clever manager, Mr. L. R. Dutton. This, too, is to be published for circulation amongst builders and architects. The "Handbook for Salesmen" is in forward state of preparation. This ended the first days' technical work. And here let me end with a few short facts of general interest. The membership totals 2,663; the cash balance exceeds $10,000; about 1,000 are registered in attendance—at one time in the proceedings this afternoon, 850 assisted; to night, the President receives the visiting delegates at the Bellevue-Stratford; the business session to-morrow commences at 2 P.M., the morning being given to the inspection of the appliance display. The weather is rather "raw," but enthusiasm and interest bubble everywhere. I might here mention with propriety that a most graceful (yes, princely) act, was performed by Mr. John Gribbel, who, at the banquet of the St. Andrews Society (the Bellevue Stratford, the evening of the first inst.) announced that the famous Glenriddell manuscripts of the world's peoples' poet, Robert Burns, which had been purchased him some months ago at the sale held by the Athenaeum Library, of Liverpool, England, would be presented by him to the government of Scotland for keep in its archives. How's that for American recognition of the fitness of things?—W.

PHILADELPHIA, Dec. 3, 1913.

The morning plan as presented in my message last night was duly observed. The Exhibition Hall certainly drew the gas men, and while the show of appliances is many and varied, at least nine-tenths of the booths are so crowded that a proper show of the wares is impossible. The public came in goodly number, but I fear they are not likely to be favorably impressed, altogether traceable to the crowding and confusion. Nor is this reflecting at all on the Committees, for Philadelphia lacks a suitable building for di-plays of this nature. The Academy of Music makes a good meeting hall, its acoustic properties are excellent, and its seating arrangements are well fitted for the sessions. The main value of this meeting is that everyone present has something to say in debate on the various technical reports presented, hence the convention will do a lot of good for the active gas man; but I very much question if the appliance men (who have been put to large expense in connection with their exhibits) will reap the benefit that they should from their outlay.

The lighting effects on Broad street and in the buildings are absolutety wonderful, and a positive credit to the firms that designed the system and carried it to such a marvellous effectiveness. At this afternoon's technical session quite 2 hours were taken in discussing the "Report on Domestic Fuel Appliances," which was read by Mr. M. Gibbons-Neff, for Chairman Howsmon. In the "Report of Board of Educational Control," submitted by Mr. J. B. Myers, the Chairman outlined the many advances made in respect of the status of the various educational courses, so well maintained by the Association. To night the ladies and gentlemen will look over the "Sunshine Girl" in the Forrest Theater, after which supper will be served in the Bellevue Stratford Hotel, the *menu* being eked out with a programme of dances, and? President Hare, by-the-way, sees to it well, remembering the agenda is long and time is short, that circumlocution and repetition in the speeches are minimized, and that concentration is a wonderful accomplisher.—CAMP.

PHILADELPHIA, Dec. 4.

This was surely a strenuous day. The morning session was commenced at 10, and the afternoon sitting was over at 5:15. However, the President was on the job. The first number was the report on "Outdoor Lighting," prepared by Mr. A. H. Humphrey and read by Mr. E. D. Brewer. The discussion on this excellent presentation had largely to do with the best method to pursue in putting ares in use, whether by rental, sale, or gift; whether with or without maintenance. In this instance the matter was plainly brought out that the attempt to secure municipal street lighting was woefully, weak. Regarding "Indoor Lighting," Mr. Sidney Mason made a masterful report, which led to a rousing discussion. In this a very clever part was taken by Mr. Arthur Hewitt, of the Consumers (Toronto) Gas Company, who graphically outlined the plan followed by them in respect of maintenance and the like. Mr. C. D. Bond (Philadelphia) also spoke well in respect of the subject.

Right before the adjournment we were "officially" photographed (also the interior of Horticultural Hall), "we" being in the foreground. When the afternoon session was opened, Mr. Walton Clark reverted briefly to the matter of outdoor lighting, calling attention to the lack of thought given the artistic appearance of street lighting fixtures in general. As a result, a committee will be designated to make proper study of this feature. The balance of the session was taken up with the presentation and consideration of allied topics on advertising, the session being under the thoroughly capable direction of Mr. T. R. Elcock. The list included 4 separate presentations, and when these had been briefly discussed, the reading of the report on "National Advertising" was put over by the reading of a very interesting paper, on the work of the British Commercial Gas Association, contributed by Mr. F. W. Goodenough, Chairman of the British Association's Executive Committee. This paper (it was read by Mr. Elcock) caused a hearty vote of thanks to its author, which thanks were at once forwarded to him in the shape of a cablegram.

Then came the "National Advertising" consideration, which report was presented in great shape by Chairman P. S. Young. In the debate Mr. Cohn (Baltimore) was the only member of the Committee to express opposition to the scheme. In his temperate, cogent argument he urged that unsigned ads. did not carry that conviction which accompanied statements signed by the operators of local companies; that only 11 per cent. of the total companies had endorsed the scheme through subscription; that an implied community of interest between all the companies of the country was not likely to be kindly received by the general public, with inflamed views respecting corporations in general. Mr. Hare supported the plan, as, of course, did Mr. Hasson. Mr. Wrightington also spoke briefly favoring the measure, and the matter was ended by the adoption of a motion to endorse the work so far performed by the Committee. After some announcements the session was declared adjourned. The "feeling in the lobby" is that discussion on the national advertising project should be resumed to-morrow, and Mr. Cohn is being urged to lead the movement. To-night is the "Gas Meeters" innings and evening. In fact, "Gas Meeters" are to the exclusion of everything else. About 800 pasteboards admitting to the feast have been purchased; but the subsequent doings at this convention will have to be told in "our next." —CAMP.

BRIEFLY TOLD.

MID-YEAR MEETING, EMPIRE STATE GAS AND ELECTRIC ASSOCIATION.—The first mid-year meeting of the Empire State Gas and Electric Association was held in Geneva, Wednesday, November 19th, Mr. J. C. DeLong presiding. Announcement was made of the appointment of a Safety Committee, and Mr. V. T. Noonan (Rochester), in outlining its plans, said the State had been divided into 5 sections, and that the member-companies in each section would be visited by a member of the Safety Committee for the purpose of discussing safety work, the collecting of ideas and the absorbing of new methods. The visits, of course, will not be made in a spirit of criticism, but rather for the purpose of assisting the company visited, and to secure data for the aid and use of other companies. When the regular programme of the meeting was taken up, Mr. W. H. Blauvelt, of the Semet-Solvay Company, presented a very interesting paper on "By-Product Coke Oven Gas," which was considerably discussed, the many questions asked bringing out important information. Much appreciation of the paper was evidenced, and on motion a vote of thanks was extended to Mr. Blauvelt. Mr. C. F. Brunt, of the Empire Gas and Electric Company (Geneva), presented a paper on "High Pressure Transmission and Distribution," describing the system originating at the coke oven plant at Geneva, which also supplies Auburn, Newark, Lyons, Clyde and Phelps. Others present having had experience with high pressure transmission, there was an animated discussion in regard to leakage in mains, losses of illuminating power, etc. A vote of thanks was extended to Mr. Brunt. At the close of the morning session a very enjoyable luncheon was served in the Hotel Seneca. About 70 were present at the function, and immediately after it a trip was made to the coke ovens at Geneva, and the plant inspected. Upon returning the business meeting was reconvened and a paper (by Mr. G. G. Brown, of the Ithaca Gas Light Company) on "All-Gas-Kitchen Hotel Appliances" was read by Mr. Magee, of that Company. The discussion that followed dealt very largely with the question of taking over second-hand coal ranges, where gas was to be substituted, and as to the best form of rates for this class of business. The programme and arrangements were made by a special committee, whose members are entitled to the thanks of the Association for a most interesting and instructive meeting. This was the first meeting of the Association devoted exclusively to gas questions, and both the attendance and the interest proved that the gas men were not lacking in appreciation.

NOVEMBER MEETING, PHILADELPHIA GAS WORKS' SECTION, N. C. G. A.—The November meeting, Philadelphia Gas Works' Section, National Commercial Gas Association, was held Wednesday, November 26th, in the auditorium of the Y. M. C. A. building, 1421 Arch street, with some 800 members present. During the business session, which was preceded by a dinner served in the auditorium, an election of officers for the coming year was held. Mr. S. H. Thompson, who has done so much to promote the "get together" idea, was elected President, and Messrs. Charles Potts, W. P. Bailey and M. Gibbons-Neff were chosen Vice-Presidents, with Mr. T. G. Williams as Secretary and Treasurer. In addition to these, Messrs. R. E. Dallas, Hiram Wynne and A. F. O'Donnell were elected as Directors for the ensuing year. The retiring President (Mr. Elcock) delivered an address, in which he reviewed the work of the Section during the past year, and pledged his hearty support to the new administration. His remarks were followed by addresses from Mr. S. H. Thompson, the newly elected President; Mr. C. W. Hare, President, N. C. G. A.; Mr. C. O. Bond, President, Illuminating Engineering Society; Mr. A. B. Kelly, Mr. J. B. Myers, Mr. T. H. Jackson and Mr. W. J. Hibbs. The Section presented a gavel to Mr. Hare to be used at the general convention. In his acknowledgment, which was enthusiastically received, he appealed to the members to be loyal to their Association, loyal to their companies and loyal to themselves, citing the successful progress of the parent body, due to the hearty support of all its members. The honor of being selected as the one who had worked the hardest during the past year towards promoting the interests of the Section fell to Mr. Aaron Senator, and as a token of appreciation the members presented him with a suitably engraved pocket knife.

CURRENT MENTION.—

MR. JUDSON G. DICKERMAN, Chief of the Gas Testing Bureau, Chicago, has, through the action of Mr. Morris L. Cooke, Director of the Philadelphia Department of Public Works, become Chief of the Philadelphia Gas Bureau. He succeeded Dr. Hollis Godfrey, who resigned to accept the Presidency of the Drexel Institute. Mr. Dickerman is a native of Massachusetts, is 40 years of age, and is a graduate of the Massachusetts School of Technology.

IN the special election ordered by the authorities of Mt. Pleasant, Ia., to determine whether or not an ordinance granting to Mr. George Carson, of Iowa City, and associates, the right to operate a gas plant in Mt. Pleasant, should be indorsed, was virtually unanimously in favor. The total votes cast numbered 288, of which 7 were in the negative. Mr. Carson will expend not less than $20,000 on the betterment scheme that he is arranging.

MAYOR BUSCHEMEYER, of Louisville, has instructed City Attorney Beckley to draw an ordinance prescribing in detail the formation of the office of City Gas Inspector, who is to have full control of matters determining the quality of the gas supplied, the testing of gas and electric meters, etc. The Mayor has issued instructions that the tenets of the measure shall be such as to require the services of a qualified expert. The corresponding existing position to the one proposed is filled at present by Mr. John Vreeland.

MR. J. R. ANDERSON, of Pasadena, Cal., has applied to the State Commission for the authority necessary to enable him to sell gas in Oakdale to the projectors of the Oakdale Gas Company.

MR. ALFRED WALLACE has been promoted from the position of Superintendent of the Columbia (S. C.) Gas and Electric Company to the place of General Manager to the corporation. Mr. Clarence P. Westlake succeeds Mr. Wallace in the Superintendency.

THE City Commissioners, St. Petersburg, Fla., have declared void the franchise formerly granted to one William C. McClure, under which he pledged himself to build a gas plant in the named place within a specified period. This action also forfeits the bond in $1,000 that he executed.

Correspondence.

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

M. Mayers Declares the Blaugas Trials Were Satisfactory.

PUBLIC SERVICE CONSTRUCTION COMPANY,
SAN JUAN, PORTO RICO, Nov. 25. 1913.

Atlantic Blaugas Company, New York City.

Dear Sirs: We note, in the AMERICAN GAS LIGHT JOURNAL (page 297, issue of Nov. 10, 1913) the following: "The advance demonstrations are being carried on through the not altogether satisfactory agency of Blaugas." We are not familiar as to where this information was gathered, but beg to state that the results obtained by the use of Blaugas for demonstrating cooking and lighting, in advance of turning on gas in a new gas plant, have been highly satisfactory, and we will strongly recommend it to any company who desires to begin business with a large number of consumers.

Yours very truly,
PUBLIC SERVICE CONSTRUCTION COMPANY
J. ALEX. MAYERS, Pres.

(*Continued from page* 359.)

practical. It was noted that decreasing the distance between the electrodes made a marked decrease in potential.

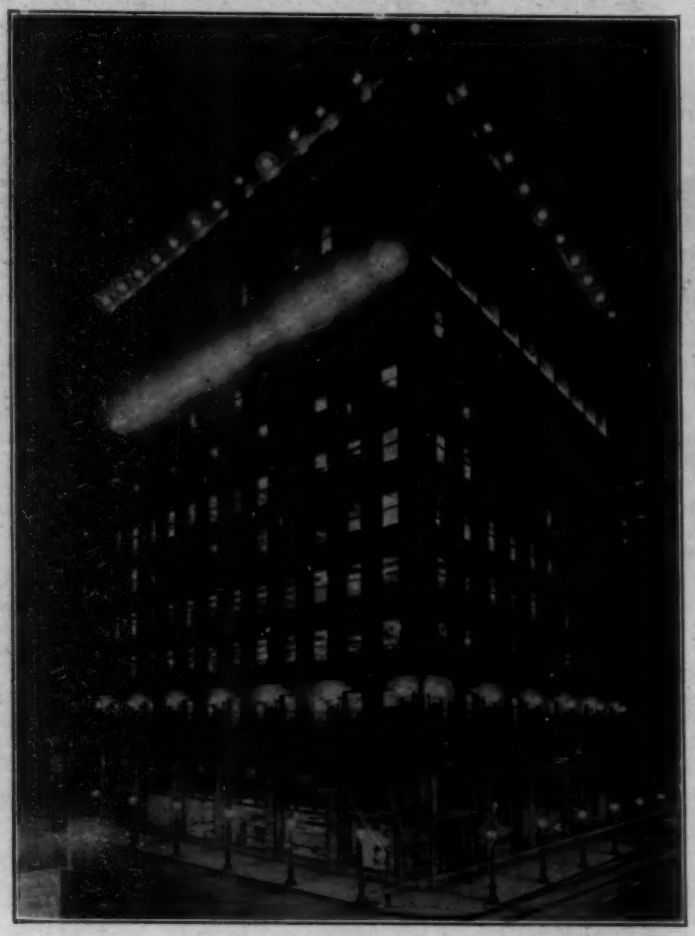
Accordingly a series of electrodes was prepared with very small intervening spaces, and tried with a source of direct electromotive force, the potential difference between the plates being below that required for any ionizing discharge. It was found that at these small distances distinct cleaning effects could be obtained, but maintenance of the electric charge was troublesome owing to short circuits between the electrodes by deposits of tar and moisture.

Whatever be the correct explanation of the phenomenon, its effectiveness and importance are beyond question. The first commercial equipment has now been in continuous operation for approximately 18 months, handling gas for a producer plant of approximately 1,000 horse power. The largest installation is an equipment for cleaning 200,000 cubic feet of gas per hour, for the largest single unit producer plant in this country.

Lighting Equipment of the Laclede Gas Light Company's Building, St. Louis.

When President C. L. Holman, of the Laclede Gas Light Company, St. Louis, was finally passing on the detail plans of the palatial new gas building for St. Louis, he decided to put the lighting equipment in the hands of the General Gas Light Company, and trust to Mr. Humphrey and his staff to make it a representative, last-word, installation of all-gas illumination.

Mr. Holman gave them *carte blanche* as to design and expense, only stipulating that all the fittings should be commercial fixtures, that could be duplicated for sale and recommended as efficient as well as ornamental. How well they succeeded, artistically and commercially, is shown in a measure by the illustrations herewith.

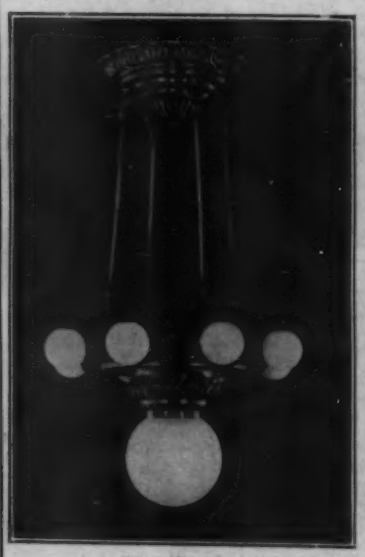


Exterior Night View.

The night view of the exterior shows the curb lighting by gas arcs on specially designed posts, the row of arc torches around the second floor, and the bands of arcs at the cornice.

The view of the lobby (see following page) shows the ceiling units, the central globe covering an arc and the marginal globes single, inverted mantles. An alternative lighting system is furnished by the single mantle, vertical torches on the magnificent columns, either system being adequate to give sufficient illumination by itself.

Fig. 2.—View of the Order and Complaint Counter.



Figs. 3 and 4.—Ceiling Fixture and Indirect Bowl.

Fig. 5.—One Room of Accounting Department.

Fig. 1.—View of the Lobby.

Fig. 2 affords a view of the order and complaint counter under the balcony, showing the semi-indirect bowls lighting that portion.

Figs. 3 and 4 are larger views of the ceiling fixtures and the indirect bowl.

Fig. 5 shows one room of the accounting department, giving emphasis to the excellent distribution on desks and floor. This entire building and its lighting equipment we consider an example of perfect adaptation of means to an end. It is a fitting monument to the Laclede Company and its officers; and a fine specimen of what the General Gas Light Company can accomplish in its chosen field.

New Methods and Appliances.

SAFETY FIRST.—In its campaign to lessen the occurring of what may be termed avoidable accidents in its factories or plants, the United Gas Improvement Company is educating its employees by precept and example. As examples of some things to avoid and prevent, we are privileged to publish these illustrations selected from the hundred or more that the U. G. I. has prepared and copyrighted.

Fig. 1 shows yard gates, that swing outward over a public footway, a frequent source of injury to passers.

This affords a good illustration of how gates should not be hung to swing outward over a footway much travelled by children in going to and returning from school.

The next picture shows an exhaust pipe projecting through a window into a passageway. The danger of being scalded by steam or hot water from this pipe was made more serious by the fact hat the engine was running intermittently. The remedy is, to either run the pipe into a well, or to exhaust vertically.

Here is a manhole cover, constituting a common tripping hazard, and, owing to the size of the ring, the foot of an employee might become wedged therein to the point of breaking it. The ring should be countersunk so as to drop level with the cover.

Fig 1.

Wheelbarrows so stored that the handles may strike a passing employee in the groin, the affair merely suggesting more careful storage.

Fig. 5 shows a particularly dangerous steam-line outlet in front of a boiler. The outlet was about 5 feet above the floor and so placed that, should the valve be turned on, the escaping steam or hot water

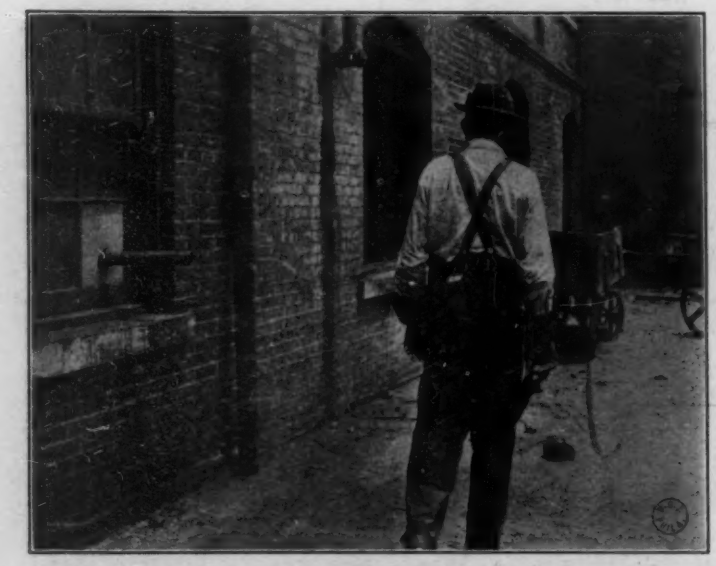


Fig. 2

Fig. 4.

Fig. 3.

Fig. 5.

Fig. 6.

Fig. 7.

might scald a workman. Outlets of this sort should discharge vertically.

This shows how a guard or precaution no longer useful may become a hazard greater than the one originally intended to guard against. In this case, pieces of pipe are driven into the ground to keep some rails in position. Only one rail remains, leaving the pieces of pipe in way to trip a workman not on the lookout for danger points. The remedy is to remove all supports no longer needed.

Here is a grouping of a shovel, rake and oil can. The shovel lies as frequently found—in position to do serious injury. An employee running or walking might go directly into the broad edge, which is at times as sharp as a knife. The rake introduces a liability of the teeth running into one's foot. An employee, fortunate by wearing shoes with heavy soles, stepped on the teeth of a rake, with the result that the handle flew up, and made an impression on his face that stayed with him for a week. Of course, oil cans should be kept off floors, a fall on the point of such a can being quite a serious matter.

THE STALEY POWER TAMPING MACHINE.—By the aid of power tamping machines the slow and unsatisfactory hand tamping of backfilling and dry concrete has been materially improved upon, and it remained for the Wemlinger Company to put on the market the Staley power tamping device, which, it is stated, has in certain cases cut the backfilling of trenches to 8 cents per cubic yard. The machine is especially valuable for street work, where the pavement must be relaid as soon as the backfilling is completed.

The accompanying illustration shows that the machine consists of

two main parts: The sweep, on which is mounted the lifting mechanism, the tamper and the engine; and the two-wheeled truck carrying the sweep. The latter consists of two steel channels, with necessary spacers, bracing and truss rods, and it is mounted on a pivot, permitting it to swing in horizontal plane, thus allowing the tamper to be moved across the work while the truck is being wheeled forward. A forward movement of 8 inches per sweep is necessary to cover the work.

The lamping head can be had in various sizes, the regular one being 8 inches by 9 inches. It is stated that a tamper using this head, and operated by one or two men, according to the work, will tamp from 1,200 to 1,500 square feet of surface per hour. On trench work it will tamp 10 layers in a trench 30 inches wide, and progress 40 to 50 feet per hour. It will strike any point in a trench, or on a surface, from 1 to 4 feet in width, and at any level, from 1 foot above ground, to 6 feet below. The length of stroke is 2 feet. The tamping head, which weighs 80 to 90 pounds, delivers from 50 to 60 blows per minute, and the net weight of the machine complete is 1,200 pounds.

Mr. C. C. Simpson, Jr., Engineer of Mains, Consolidated Gas Company, New York city, says: "By the use of the Staley tamper, we have been able to do backfilling work as low as 8 cents per yard, and we have, moreover, been able to put back in the trench every last bit of earth, thus doing away with the carting of this material to the dump, thereby effecting a still further saving."

One prominent New York conduit contractor is using 9 of these power tampers at the present time with the greatest satisfaction. Mr. Geo. C. Warren, in a paper read before the American Society of Municipal Improvements, says he considers this tamper of the utmost value in backfilling work, and states that it is far too little used. Mr. Warren has experienced a great deal of trouble in laying pavements over poorly backfilled trenches, and believes that, by the use of the Staley automatic tamper, this trouble can be terminated.

AN ALL-GAS LUNCH ROOM.—This illustration (furnished us by Mr. B. K. Johnson, of the sales' force, the Welsbach Company) shows the interior of the 'Select Cafeteria," Newark, N. J. The entire equipment (lighting and cooking) was installed by the Public Service Gas Company, under the immediate direction of Mr. E. K. Slater. The illumination is by No. 20, Welsbach units, with alabaster globes and frosted bottom cylinders, giving a soft, mellow glow, evenly

distributed, helped out by the white enameled ceiling. All the foods served are gas cooked. In the kitchen are placed a gas hotel range, a gas pastry oven, and a gas water heater. At the serving counters are gas heated steam tables, plate warmers, coffee urns and a milk warmer, all in full view of the patrons. Altogether it is a very attractive and sanitary outfit, and acts as an excellent advertiser for the Gas Compaay.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,077,342. Gas Analyzing Apparatus. J. W. Hays, Chicago, Ills.

1,077,409. Protective Service for Gas Meters and the Like. Herman Kaufman, New York City.

1,077,578. Gas Producer. W. O. Amsler, Pittsburgh, Pa.

1,077,713. Gas Burner. L. C. Hiller and F. I. Camp, Meriden, Conn.

1,077,756. Incandescent Gas Lamp. L. M. Ruben, New York City.

1,077,922. Method of and Means for Manufacturing Mantles for Incandescent Gas Lighting. I. Weber, Vienna, Austria-Hungary.

1,077,927. Automatic Gas Analyzer. Percival R. Boulton, Birmingham, England.
1,077,955. Safety Gas Burner. C. G. Farez, New York City.
1,077,981. Stirrer for Gas Producers. J. A. Herrick, Newark, N. J.
1,077,985 Gas Flashlight Advertising Device. T. Jackson, London, England, assignor to himself and A. Ramsay, Chesham, England.
1,078,014. Art of Treating Coal Gases. C. G. Tufts, Syracuse, N. Y., assignor to Semet-Solvay Co.. Solvay, N. Y.
1,078,089. Gas Control Valve for Water Heaters. H. Eisenach and W. F. Smith, Detroit, Mich.
1,078,148. Water Seal for Gas Producers Working with High Pressure Blast. A. von Kerpely, Vienna, Austria-Hungary.
1,078,160. Combustion Apparatus and Gas Producer. G. H. Niles, St. Louis, Mo.
1,078,163. Safety Device for Gas Supply Apparatus. F. Picot, Paris, France.
1,078,257. Meter. H. Chrisman. Edgewood Park, Pa., assignor to Pittsburgh (Pa.) Meter Co.
1,078,304. Process of Producing Gas. J. and F. C. Nix, Alhambra, Cal., assignors to J. A. Merrill, same place.
1,078,480. Apparatus for Regulating the Supply of Steam to Gas Producers. C. H. T. Alston, County of Chester, and P. T. Houston, London, England.
1,078,588. Gas Burner. C. B. McElwaine, Tulsa, Okla., assignor of one-half to R. E. Markham, same place.
1,078,625. Gas Regulator. P. Keller, Chicago, Ills.
1,078,726. Gas Burner. E. H. Fisher, Pittsburgh, Pa., assignor to Scientific Materials Co., same place.
1,078,834. Gaseous Fuel Mixer. T. Cook, Indiana, Pa.
1,078,841. Gas Cooler. G. Erchellman and A. Harmuth, St. Petersburg, Russia, assignors to General Chemical Co., New York City.
1,078,875. Gas Cock. A. R. Pyle, Dobbs Ferry, N. Y.
1,078,896. Combined Coal and Gas Range. P. Becker, Cleveland, O., assignor to M. M. Kock, same place.
1,078,937. Purification of Gases Containing Sulphur Dioxide. R. Messel, London, England, assignor, by mesne assignments, to General Chemical Co., New York City.
1,079,011. Gas Generator and Compressor. F. D. J. Kaessmann, Coffeyville, Kas.
1,079,084. Gooking Stove. W. White, London, England, assignor of one-half to F. E. Brown, Sidney, New South Wales, Australia.
1,079,091. Gas Generator. T. H. Armstrong, Chicago, Ills., assignor to S. Pearlman, same place.
1.079,103. Combined Meter and Valve. A. A. Bowser, Fort Wayne, Ind., assignor to S. F. Bowser & Co., same place.
1,079,113. Gas Generator. O. H. Ensign, Madison, Wis.
1,079,122. Device for Automatically Cutting Off the Supply of Gas to a Burner. C. Gordon, Los Angeles, Cal.
1,079,126. Coke-Drawing Apparatus. J. Hayes, Uniontown, Pa., assignor of one-fourth to J. T. Whitson, same place.
1,079,146. Gas Regulator. J. R. Ricketts, Los Angeles, Cal, assignor to Perfection Gas Regulator Co., same place.
1,079,219, Heat Distributer or Bake Oven for Gas and Gasoline Stoves. B. F. Davis, Washington, D. C., assignor, by mesne assignments, to J. M. Himes, same place.
1,079,234. Gas Producer. C. M. Garland, Collingwood, N. J., assignor to Camden Iron Works, Camden, N. J.
1,079,281. Gas Burner. J. H. Ackroyd, Elizabeth, N. J.
1,079,327. Burner. F. C. Chadborn, Newburgh, N. Y.
1,079,337. Gas Valve. E. W. Haver, London, England.
1,079,416. Gas Supply Controlling Means. L. A. Korb, Richwood, W. Va., assignor of one-half to B. Sicking, Cincinnati, O.

Items of Interest
FROM VARIOUS LOCALITIES.

THE W. F. Boardman Company, of San Francisco, reports many orders for the Ferox material prepared on and by the method of the Consolidated Gas Purification and Chemical Company, Nashville, Tenn. And this leads to the further mention that, following the placing of "Little Grids" (patented in 3 boxes) in the Nashville (Tenn.) gas works, another rack of grids has been ordered, which will completely convert the square purifier plan to the exclusive use of "Little Grids" for supporting "Ferox."

MR. E. B. BEATTIE has resigned the position of Manager, the new business division, Elkhart (Ind.) Gas and Fuel Company. He has attached himself to the travelling salesmen's staff of a furniture factory, with headquarters in Grand Rapids, Mich.

MR. J. P. CONLEY, who is one of the active men in the administration of the Port Arthur (Tex.) Gas Company, reports that the piping system will be completed within 2 months.

MR. CURTIS JACKSON has been promoted to the vacancy on the staff of the Clinton (Mass.) Gas Light Company, occasioned by the transfer of Mr. Reynolds.

"B. M. L.," writing from Bakersfield, Cal., under date of November 22d, incloses this: "The California State Railroad Commission will hold a hearing the 18th of December, in this city, in the instance of the complaint made by the Kern County Merchants' Association against the California Natural Gas Company, which hearing is being awaited with interest, in that it will have an important bearing on the matter of securing lower gas rates here. The real contention is that the charge made to the San Joaquin Light and Gas Corporation by the defendant for gas is higher than it should be, hence the high rate ruling in Bakersfield. Some months back the city trustees declared an ordinance putting the rate at 50 cents per 1,000, but the Company proved to the satisfaction of the authorities that its average charge of 90 cents per 1,000 was not unreasonable, owing to the high rate it was obliged to pay the California Natural Gas Company, and that a 50-cent rate would be virtually confiscatory."

THIS came to hand late last week, by way of Danbury, Conn.: "Banquets and sessions are often quite of a vaporous nature, but the meeting of the gas experts and salesmen of the H. L. Doherty & Company forces at the Hotel Green some evenings ago was avowedly of such character. The speechmaking naturally had to do with gas selling rather than gas making, in that the dinner was given by the local commercial force of the Danbury and Bethel Gas and Electric Lighting Company, which is a member of the properties owned by the H. L. Doherty syndicate. After the more serious technical discussion of the evening was at an end, a session of enjoyable relaxation followed, in which hour-of-ease S. R. Falke, who was playing at the "Empress" Theater during the week, sang several numbers. Amongst those present were: Henry La Belle, Bert H. Jardine, J. W. Rutherford, of the Company; Mayor Anthony Sunderland, and Messrs. C. E. Mead, A. C. Drummond, O. H. Barnum, George E. Matthews and C. E. Thompson."

MR. R. C. FOYLER, Advertising Manager, the Detroit City Gas Company, recently delivered a "sparkling address" before a large audience (in the Association of Commerce Building), mainly before members of the Grand Rapids (Mich.) Advertisers' Club. His subject was "Getting It Across." We note that the address was a "sparkling" one, and we judge this to be true in that the "Only Schroeder" said so.

MR. R. E. JONES is mapping out a system of main additions and substitutions with a a view to bettering the gas supply conditions at the Phœnixville (Pa.) plant of the American Gas Company.

AT the annual meeting of the Alabama Light and Traction Association, held in the office headquarters of the Mobile (Ala.) Gas Company, the 21st ult., these officers were chosen: President, R. L. Ellis, Manager the Selma (Ala.) Lighting Company; Vice-President, T. K. Jackson, Manager the Mobile Electric Company; Treasurer and Secretary, H. O. Hansen, Asst. Manager Mobile Gas Company; Executive Committee, A. H. Floyd, Birmingham, Ala.; C. C. Henderson, Greenville, Ala.; C. E. White, Montgomery, Ala.; R. L. Rand, Anniston, Ala.; A. R. Smith, Demopolis, Ala. The Committee was charged with naming the next place for meeting, such meeting to be held in Mobile, at a date to be selected some time in May, 1914. The meeting this year was presided over by Mr. C. C. Henderson, President of the Henderson Light and Power Company, of Greenville, and his address (which was a well put-together presentation of the main problems that are confronting present day public utilities) was followed by the considering of these papers: "The Operation of a Power Plant in a Small Town," by Mr. R. H. Smith, of the Greensboro Water and Light Company; "Some Pertinent and Impertinent Questions," by Mr. T. K. Jackson; "The Oil Game," by Mr. R. L. Ellis—this one gave rise to a very pointed discussion. Some of the main remarks thereon would not be particularly grateful nor posi-

tively pleasing to the interests the representatives of which are chiefly domiciled in 26 Broadway, N. Y. A feature of the meeting was an active demonstration of the pulmotor, by the rescue corps of the Mobile Electric Company. The social features of the session included a banquet, served in the Cawthorn Vineyard, that was thoroughly enjoyed. The delegates answering the roll call were:

Burgess, C. E.	Kersting, A. F.	Smith, A. R.
Beauchamp, T. L.	Keen, W. W.	Smith, R. H.
Clingerman, J. H.	Morgan, J. H.	Underhill, A. V.
Gorinflo, W. T.	McGehee, A. M.	Weaver, J. E.
Hansen, H. O.	Page, P. P.	Wilson, J. H.
Harris, G. H.	Perry, W. T.	Wilson, O. C.
Henderson, C. C.	Rand, E. L.	Wright, R. B.
Jackson, T. K.	Rourke, W. O.	Wyckoff, C. B.
Jameson, M. P.	Syler, S.	

MR. W. D. MCHUGH has been joined with his partner, Mr. W. H. Herdman, in the litigation over the dollar gas rate ordinance that has been so long in progress in Omaha, Neb. Heretofore the case was conducted by Mr. Herdman alone. Of course, they represent the Gas Company in the proceedings.

"THERE can be no doubt that the people of Wilson, N. C., are more than anxious to have a dependable supply of gas, especially in view of the fact that the special investigation, conducted by the Board of Public Works as to which would be the more desirable plan to follow—to construct and operate on public account, or to grant a working ordinance to responsible parties on company account—has been turned in. The Board had the matter under consideration for several months, and reviewed it from almost every possible angle, finally reaching the conclusion to recommend the last named policy. The report, too, gives cogent reasons for such determination. The main one, however, is the admission that the project appeals forcibly to the best element—business and domestic—of this rapidly growing, solid, unified community. I assure you that a properly capitalized company, that will build a modern works, and subsequently carry on its trading in a liberal manner, will be a profitable operation for those who invest in such an enterprise.—MASON."

ACCORDING to the certified copy of the articles of incorporation filed with the County Clerk (Mr. W. R. Curtin), of Madera, Cal., last month, it is disclosed that the incorporators are Messrs. Lovell F. Kurty, P. T. Moses and Helmer L. Decker, all of Los Angeles. The corporation is to be known as the Madera Gas Company; and is capitalized in 75,000 shares par value of $1 each, presumably all paid up. Our information respecting the parties in nominal interest is that they represent men of means, who propose to go on at once with construction work.

WE understand that the work of cleaning-up in the new plant of the Memphis (Tenn.) Consolidated Gas Company is completed, and that the junction of Kansas and McLemore avenues is a busy place these days. The plant's present location happily precludes any repetition of the harrowing flood-stages of the Mississippi this year and last.

A CORRESPONDENT in Baltimore, Md., writing under recent date, says that, in the rebuilding of the road known as the Fallsway, it was necessary for the Consolidated Gas, Electric Light and Power Company to remove the 24-inch "girder gas main" that crossed the falls at Monument street. This really imposing structure has for years been a landmark of that once romantic spot—'twould be a right lively imagination that could conjure up at this time anything romantic in connection with this section—and many a rural party from Harford, Wicomico and other more or less primitive dirstricts has wondered what that pipe span was really intended to accomplish. However, the Company has laid a new "girder span" atop of the Fallsway covering. It may be interesting to here note that the old girder was constructed in 1877, or 9 years after the tremendous floods of 1868, during the coursing of which all the bridges over Jones' Falls, south of Edgar street, were swept away.

A CORRESPONDENT, quoting Mr. Wm. H. Chapman, Manager of the Houston (Tex.) Lighting and Power Company, says that he is not aware of any negotiations whereby the proprietorship of the Houston Lighting and Power Company has passed into the hands of the syndicate that operates or owns the Houston Gas and Fuel Company. As far as Mr. Chapman is informed, the Houston Lighting and Power Co. still remains in the group controlled by the American Cities Company. However, the contract of the operating Company (Ford, Bacon & Davis Engineering Company) expired December 1, and that the local plant would thereafter be operated by another concern was assented to by Mr. Chapman. He did not know whether this meant any change in the local staff, which certainly was efficient in direction.

"GALLATIN," writing from Wilmington, Del., under date of November 28th, says that the Wilmington Gas Company will defray the cost of teaching a cooking class at the Peoples Settlement. That Association now maintains two classes of such nature, but as each class is limited to 12 pupils, and as at least 50 are desirous of getting the instruction, the Gas Company's offer solves the problem. A "Supper Club" has been formed by certain of the Settlement young women, who, semi-weekly on the way home from their respective "places of business," stop at the Settlement to prepare their suppers, under instruction of qualified teachers, each amateur paying a small charge for the foodstuffs used.

THE concern of the United Gas and Electric Engineering Corporation, of Manhattan, has been incorporated by Messrs. Henry Morgan, George H. Olney and William M. Clark, all of 52 William street, city.

MR. THOMAS QUIRK, for years connected with the old Brooklyn (N. Y.) Gas Company, as Chief of its Lamp Department (he has been on the retired list for several years), died, at the home of his son (Thomas J. Quirk) the morning of November 27th.

"B. L. V.," writing from New Orleans, La., under date of the 29th November, says: "Of course you have had most of this, but I'll take the chance of letting you know that important changes have been made in connection with the administration of the New Orleans Railway and Light Company. Mr. Hugh McCloskey resigned the Presidency of the Company to take the post of President, the American Cities Company, vice Mr. George H. Davis, resigned. He was also elected Chairman, the Board of Directors, of the Railway and Light Company. Mr. J. S. Pevear, hitherto Vice-President, the International Railway and Light Company, has been elected Vice-President of both the American Cities and the Railway and Light Companies. These changes were effective the first inst."

THE syndicate interested in the operation of the Mt. Jackson (Pa.) gas supply has under consideration the extension of a like service to the outlying district of Wampum, Pa.

DR. HASTINGS, Medical Heath Officer, Toronto, Canada, is framing a special ordinance under which it is proposed to order and enforce a periodic inspection of household gas service pipes and gas gxtures.

THE H. Wales-Lines Company has been awarded the contract for a conbination structure to be erected forthwith on the Cooper street site of the Meriden (Conn.) Gas Light Company. The structure (100 feet long, 40 feet in width, and two stories in height) will include provision for a storehouse, fittings and meter repair shops and a garage.

THE Amesville (O.) Gas Company has been incorporated by F. H. Gifford and associates. This is likely a natural gas concern, for the place has not to exceed 1,000 residents.

THE Wisconsin Utilities or Railroad Commission has ordered that these rate charges shall become effective January first—the concessions average 15 per cent. all round over existing charges in Portage:

Monthly Consumption, Cubic Feet.	Net, per 1,000.
$1,000 to 2,000	$1.30
Next 3,000	1.20
Next 10,000	1.10
Over 20,000	1.00

THE discussion with the Public Service Commission, Second New York District, by the officials of Watervliet, respecting the difference in gas charges, as between the named place and Schenectady and Troy, will likely result in this compromise. The rate will be fixed at $1.10 per 1,000 (the ruling rate is $1.20), commencing January 1, 1914, concessions of 5 cents per 1,000 to be made January 1st, 1915 and 1916, thus bringing the rate to $1, which is to be considered a normal one for an indefinite succeeding period.

The Market FOR GAS SECURITIES.

There is little or no change respecting quotations for Consolidated, which come in to-day (Friday) at 127 to 127¼. These figures show a gain of ¼ point in the bid over last week, but if the Company's intention to do what it proposes to now were made not so very long ago the stock would have jumped at least 10 points, par. The management is proposing to issue 20 to 25 millions dollars, 6 per cent. convertible debentures, these to be subscribed for by holders of record at par, in proportion to their holdings. This will furnish the cash necessary to take up the 15 millions of 6 per cent. notes outstanding, to mature February 25, and is an earnest of the cleverness of the gentlemen in financial control.

It is an accepted fact that the New York Edison's application for the right to issue 15 millions stock, as well as the application of the Astoria Light, Heat and Power Company to issue 5 millions bonds and 9¼ millions stock, will be allowed by the Public Service Commission. This, of course, furthers the assets of Consolidated, in that the Edison branch stands debtor to it in the sum $15,800,000 borrowed money. The Consolidated holds demand notes of the Edison concern and the Astoria corporation will take all the new Edison stock and bonds at par. Meanwhile it is well to understand that the Consolidated owns all the stock of the Edison, also all the stock and bonds of the Astoria, these latter being respectively 10 millions and 5 millions dollars. Of course the Public Service Commission passes upon these increases, the legitimate need and propriety of which increases are beyond question.

Brooklyn Union is as before; in fact, there is little showing of change in values, according to quotations, in any gas security. The possible exception is Peoples, of Chicago, which is up a point. The demand for gas bonds is still in evidence. Standard firsts (5's) are par bid; and New Amsterdam 5's are at the par mark. From our point of view, Standard common, which is said to be offered at 60, looks particularly good. Another attractive bond is New York Gas, Electric Light, Heat and Power (4), at 81. A manifestation in respect of gas bond values would seem to be shown by a sale this week of 2 bonds of $500 each (5's) of the Washington (D. C.) Company at 107¼. The money to pay for these was withdrawn from a savings bank.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

DECEMBER 8.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	127	127¼
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	8,500,000	1,000	101	103
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	101	104
Mutual Gas Co.	8,600,000	100	157	157
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	59	62
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98¼	100¼
New York and East River—				
1st 5's, due 1944, J. & J.	8,500,000	1,000	103	106
Con. 5's, due 1945, J. & J.	1,500,000	—	96	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	105	112
Standard	5,000,000	100	102	104
Preferred	5,000,000	100	92	94
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	91	95
The Brooklyn Union	15,000,000	1,000	121	126
1st Con. 5's, due 1948, M. & N.	15,000,000	—	105¼	107
Yonkers	200,650	500	130	—
Out-of-Town Companies.				
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	970,000	1,000	94	96
Bonds	75,000	—	—	100
Cincinnati Gas and Electric Co.	20,500,000	100	67	69
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus Gas Light & Fuel Company	1,682,750	100	65¾	66¼
Preferred	3,026,500	100	33	35¾
Consolidated, Baltimore	13,460,084		118¾	119
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,061,000	—		—
Con. Gas Co., Baltimore City, 4½	2,751,000	—		—
Consumers, Toronto	2,000,000	50	200	204
Essex and Hudson Gas Co.	6,500,000	—	188	190
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	138
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	85	90
" Bonds, 5's	2,650,000	—	90	93
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Laclede Gas Co., St. Louis	10,000,000	100	93	97
Preferred	2,300,000	100	—	102¼
Bonds	10,000,000	1,000	102¾	103
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	108	
Massachusetts Gas Companies, of Boston	25,000,000	100	91¾	91¾
Preferred	25,000,000	100	92¾	93
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	118	120
1st Mortgage	20,100,000	1,000	102	102¼
2d "	2,500,000	1,000	104	—
Pacific Gas and Electric Co.	15,500,000	—	34½	35
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	98	8
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	8,447,000	1,000	94	96
Syracuse Gas Co., N. Y	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
United Gas Imp. Co.	55,502,900	50	167	168
Washington (D. C.) Gas Co.	1,600,000	200	415	420
1st Mortgage, 6's	600,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

Alabama Light and Traction Company.—Annual meeting, May ——1914. Officers, President, R. L. Ellis, Selma; Treasurer and Secretary, H. O. Hanson, Mobile.

American Gas Institute.—Annual meeting, New York, October 21, 23, 1914. Officers: President, W. H. Gartley, Philadelphia. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting————1914. Officers: President, A. A. Dion, Ottawa; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 1914. Officers: President, J. T. Hutchings, Bochester, N. Y.; Secretary, C. H. B Chapin, 29 W. 39th street, New York City.

Gas Meeters.—Monthly Section Meetings; Grand Commissioner, Will. W. Barnes, East Orange, N. J.; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, W. H. Pettes; Secretary, G. E. Smith, Sipp Avenue, Jersey City, N. J. Philadelphia Section; Chairman, Stanley Grady; Secretary, H. E. Stiteler, Broad and Arch streets. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, T. W. Jennings, Boston; Sec., F. K. Wells, 69 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman. Bethlehem Section, Trueman Weithnecht, Chairman; Sec.-Treas., Truman Buss, South Bethlehem, Pa.

Guild of Gas Managers of New England.—Annual meeting, March, 1914. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting, Cleveland, O., September, 1914. Meetings of Sections, monthly. Pres., Charles O. Bond; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 43d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 26 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, Davenport, May 27, 28, 29, 1914 Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1914 Arkansas City. Officers: President, Al. Newman, Arkansas City; Secretary and Treasurer, Ivan Thomas, Wichita Kas.

Michigan Gas Association.—Annual meeting, September, 1914. Place, undetermined. Officers: President, H. W. Douglas, Ann Arbor, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1914. Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, St. Louis, Mo., May 19 and 20, 1914: Officers: President, E. L. Brundrett, Kansas City, Mo.; Secy-Treas., T. Clive Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914. Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Next Meeting, —— ——, 1914, Asbury Park N.J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N.J.

Ohio Gas Association.—Annual meeting, February —— 1914 Columbus, O.; President, John M. Gifford, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City, May, ——1914. President, F. R. Bowman, Ada; Secretary-Treasurer, H. V. Boze, Oklahoma City.

Pacific Coast Gas Association.—Annual meeting, Long Beach, Cal., September ——— 1914. Officers: President, C. S Vance, Los Angeles, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ——, 1914; Officers, President, J. A. Frick, Allentown, Pa.; secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913: monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city.

Southern Gas Association.—Annual meeting, Mobile, Ala., April 4, 1914. Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May 22, 23 and 24, 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary-Treas., J. D. Walker, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May ———1914, Milwaukee, Wis. Officers: President, Ewald Haase, Milwaukee, Wis.; Secretary-Treasurer, Henry Harman Milwaukee, Wis.